THE DIFFERENTIATION OF ALBERTA SERVICE CENTRES

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Summary

The study is a classification of 376 Alberta service centres based on the differential location of 83 commercial functions in the centres. The report describes the data and techniques used in the analysis as well as the typical functions found in the eight groups of places that were identified and their spatial distribution in the province. The results show that a hierarchical sequence of service centres is still present but the map of the numbers and distribution of places at each level shows that they display considerable variations in the different parts of the province.

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by

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INTRODUCTION

Geographers, economists, sociologists and planners have long been interested in the study of rural service centres for such places provide the nodal points of social and economic life in agricultural areas. They are the local trade centres to which people journey to obtain the goods and services they do not produce for themselves and are, in addition, frequently centres of social life. A considerable body of literature has grown up on this topic, dealing not only with the *theory* of service or central places (Christaller 1932; Berry 1966; Beavon 1977) but also with the *empirical evidence* for such service centre systems in many parts of the world. This report contributes to the latter literature by providing a contemporary classification of Alberta service centres or trade centres based on the numbers and variety of different commercial and professional establishment types found in these centres. As such the study updates part of a previous and more comprehensive study of Alberta Service Centres (Davies 1979). The report is divided into four parts.

(a) A short discussion on the *data sources* used introduces the study. A more comprehensive statement on scales of data and the utility of various sources is found in a previous studies (Davies 1965,1979).

(b) A summary of the *techniques* or statistical measures used to produce the classification of places follows the data discussion and provides the evidence for the results of the study.

(c) This leads to a statement on the numbers and variety of commercial establishments found in each category of Alberta towns. This identification of the *service centre characteristics* can be used to provide a basic profile against which individual centres can be compared, enabling one to identify the missing or under-supplied establishment types in a centre.

(d) Finally there is a summary of the *spatial distribution* of the service centre categories throughout the province, identifying the patterns of service centres in each area.

Three important limitations must also be stressed at the onset.

(a) This particular report, does not attempt to compare the results with the previous classification based on 1977 data, although it is hoped to extend the work in the future to encompass this additional objective.

(b) Advances in technical procedures have led to the use of more sophisticated statistical methods. Although the data (derived solely from provincial telephone directories) are comparable with the 1977 classification, there are differences in the method and techniques used in this study. Hence a comparison with the previous report would be inappropriate until the 1977 data are reprocessed using the methodology applied here.

(c) The study focuses upon the rural service centres. As such the distribution of service centres within towns and cities is ignored; instead a total count of establishments for each settlement is provided. Hence it is impossible to estimate the individual effects of particular shopping centres *within* cities or towns. To attempt such a task would necessitate much greater financial resources so as to carry out the necessary field surveys of individual service centres within the various urban nodes..

DATA SOURCES.

Many different data sources have been used in service centre studies, ranging from field surveys, through government statistics on retail trade or town community profiles, inventories produced by credit agencies such as Dun and Bradstreet, to the use of the white page information in telephone directories. A previous report on Alberta towns has described the limitations of these sources in detail (Davies 1979). Field surveys are time-consuming and expensive procedures if large areas are being studied. This approach was not feasible for a study area the size of Alberta - given the financial resources available. It is true that provincial government statistics on retail trade in Alberta (A.B.S. 1985) have the advantage of annual reporting, and also provide turnover figures for some categories of commercial activities. Unfortunately, in Alberta, the trade figures are only provided for a limited number of categories in the smaller centres. This seriously restricts their use in the type of comprehensive study dealt with here. Moreover, the statistical review of the reliability of the information (A.B.S. 1985 p. 4) reported a differential accuracy level for each category of commerce. The published effective response rate of 74% for total trade receipts ranged from 77% for

retail trade to 58% for service activities. Within the former category the overall response varied between 87% on the food, drugs and beverage group to 49% in the food and beverage services group. Such variations make it difficult to justify the use of such information at a small fown level. Town community profiles in Alberta must also be used with caution, for experience has shown they are not always updated every year. Again this could provide a differential basis for comparison, a problem that negates their advantage in providing information on the numbers of employees per store. In any case the fact that these community profiles are only available for the largest places (less than a third of the places studied here) further restricts the utility of this source for a study of all Alberta rural service centres.

Much more reliance in North American studies of large areas has been placed on the quarterly surveys of commercial and industrial activities in towns provided to subscribers of Dun and Bradstreet. In addition, Dun and Bradstreet's use of a numerical coding system for the different commercial or functional types helps the processing of this data. Tests on the accuracy of this information in Alberta did reveal some discrepancies between Dun and Bradstreet figures and field counts in small towns, mainly due to the lapse of time before new businesses were added and old ones deleted from the lists. Perhaps of greater importance is the fact that the *number* of commercial categories used in the Dun and Bradstreet books was relatively limited, and information on professionals (such as lawyers, doctors, etc.) or small service operators was not available from this source. Both these problems were considered to be important limitations for a comprehensive study of Alberta service centres.

In contrast to the other sources the white pages of the telephone directories provided a more accessible and comprehensive coverage of the complete range of commercial functions in service centres. Nevertheless, the extraction of such information proved to be very time consuming for an area the size of Alberta. An important feature is that directories are updated every year and provide a more comprehensive categorization of commercial activities than Dun and Bradstreet or other sources, both in retail and professional activities. Field checks on the accuracy of the source revealed a virtually complete coverage; indeed, small stores or businesses tucked away in remote corners of towns were often more easily identified by the phone book record than by the initial field survey. Occasional identification problems about the nature of a business can occur, but can be resolved by cross-checking in the yellow pages of classified businesses or, if necessary, by a telephone call to the business concerned. The biggest limitation of the data is that it only relates to the presence and absence of commercial functions, such as offices and stores of different types. It must be

emphasized, however, that this is the data scale upon which central place studies are usually carried out. Ideally, investigators would like turnover data for all towns and for a large number of commercial types - such as used in this study - but such information is not available.

Information on 83 different categories of commercial functions for all 376 Alberta settlements with over three functions were abstracted from the 1985 Alberta Telephone Directories. The 83 categories were the same as those used in a previous study of the province (Davies 1979) and identified the major categories of business found in these service centres. These categories were based on the rule-of-thumb that there had to be more than 20 to 25 outlets of the type (outside the six largest places) if it was to be distinguished. Given the time it takes to compile and print the directories this data reflected the service centre situation in late 1984 or early 1985. The information was organized into two data sets based on the two metropolitan hinterlands of Calgary and Edmonton (Appendix A contains the list of functions and places). This division reflected the reality of the higher order, metropolitan shopping behaviour in the province, and reduced the data set into two more manageable data files. It must be stressed that individual areas within metropolitan regions of this size are likely to have their own service centre peculiarities or distinctive character. These features depend upon a variety of factors, such as: historical development, density, income, number of competing centres, or even entrepreneurial knowledge of business opportunities in small towns. Further investigations could be carried out using a large number of data sets; perhaps based on smaller areas than the metropolitan ones used here, such as the planning regions of the province used in the 1979 study (Davies 1979). Such approaches would identify the local idiosyncracies of the small regions, but would be at the expense of a province-wide view of the character of service centres. This type of detailed, small area approach also has the disadvantage that the results of the individual study areas still have to be integrated once the local or regional classifications are complete. This is difficult to achieve in any quantitative fashion for a large number of groups - given the possible overlap in the groups or categories of place. In this report the generalizing bias produced by integrating results over the two metropolitan regions was accepted, in favour of producing directly comparable results for the settlements within metropolitan regions.

TECHNIQUES USED

A number of very different techniques have been used to classify service centres. They can be described in terms of five basic approaches: subjective definition of the grades; a quantitative description of the groups by means of a subjective definition of

grades through the assignment of a number or variety of different commercial functions for each level of place(Smailes 1944, Oldman R.P.C. 1970); the use of statistical ratios, such as functional indices (Davies 1965, 1966); univariate statistical measures such as rank correlation or analysis of variance (Berry and Garrison 1957); multivariate procedures such as factor analysis (Berry 1966) or cluster analysis (Wishart 1979).

Since all these techniques use different procedures to allocate the service centres into groups, it is not surprising to find that the results in any study area vary if the differences between the groups are relatively small. The stronger the structure of the data set the less variability is found between the results. Multivariate procedures, by simultaneously using the information contained in a data set, often with the use of statistical tests of significance, appear to have a clear advantage over other methods and have been the favoured method in the last decade, although the functional index approach (Davies 1965) seems to produce very similar results. Unfortunately for those seeking consistency of results through the comparison of multivariate studies from different areas, a number of alternative multivariate methods are available. Within each of these multivariate methods different technical procedures can also provide alternative results - that is, if the structure in the data is not strong. Although Factor Analysis methods have been a favoured option in this field, following the work of Berry (1966) and his students, it is suggested that such procedures are *not* particularly suited to service centre classification; after all, the basis of factor analysis is to identify a number of axes or factors summarizing the common and linear pattern of relationships in a data set (Davies 1984). Apart from the obvious problems caused by the assumption of linearity in the complete data set there remains the important fact that the unique variance is ignored by the extracted factors: this frequently means that a lot of the spatially important variation in a data set of service centres will be lost when factorial methods are employed.

By contrast, both Cluster Analysis and Q-Analysis procedures would seem to provide more satisfactory multivariate alternatives for the classification of service centres. Each pair of places is compared over the whole set of variables and then grouped, with the investigator making decisions about the number of groups to be abstracted. Despite the claims made for the superiority of Q-Analysis in grouping (Gatrell 1981), its current restriction to nominal scale data (1/0) means that its use in the service centre classification problem is still limited, since the number of each type of commercial function in the individual towns represents an important source of differentiation. More flexible in approach is the family of grouping techniques known as

Cluster Analysis. Again, however, variations in the number of similarity statistics that can be used, and the presence of many grouping algorithms, mean that care has to be taken to justify the particular choice of procedures. To date the most popular cluster analysis approach in the field of service study classification is a Euclidean Distance similarity measure, followed by Ward's Hierarchical Grouping technique. However, all hierarchical techniques have the drawback that once a set of places are grouped at a particular level, the group remains inviolate at higher grouping stages: in other words, once places that are clustered into lower order groups are linked into higher order clusters at the successive cluster levels, the individuals in the lower order categories remain together in a group. Yet at the higher grouping stages the end members of a group may be closer to individuals in some other cluster. This can cause severe borderland misclassifications. Non-Hierarchical measures solve this problem by re-evaluating the fit between each individual, or service centre in this case, at each cluster stage and re-allocating the place if need be. The problem of an appropriate test procedure for the groups of clusters remains, for satisfactory statistical tests for the cluster results have yet to be derived. Increasingly, Discriminant Analysis has been used to test the adequacy of the final grouping derived from cluster analysis. Again, however, a variety of different methods are available in this family of procedures, as can be seen in the standard manuals such as the Statistical Package for the Social Sciences (Nie, Hull et al. 1975).

This study of Alberta service centres used a Euclidean Distance measure as the statistic of similarity between each pair of places over the 83 types of commercial establishment. This was followed by Wishart's (1979) Non-Hierarchical procedure called Relocate. Plots of the sum of similarities at each grouping stage were used to identify the breaks of slope in the distribution of values so as to determine the number of initial groups to abstract. Unfortunately, the results obtained from this procedure were not very satisfactory for this study of metropolitan regions. The smaller places (below approximately forty different functions) were consistently clustered in a single group. This problem was not really surprising given the great size differential between towns in the data set, from metropolitan areas of over half a million population to places under 100 population. After all, the difference in number and variety of functions between some of the larger towns were far greater than those among the smaller centres. It was not considered appropriate to exclude the larger towns from the analysis, a limitation of previous and often quoted studies (Berry and Garrison 1957), since they were an important part of the study area. Resolution of this problem was achieved by carrying out two cluster analyses and basing the provisional classification on these results.

(a) The first analysis used the complete data set (or the interval scale data) containing the numbers of each different establishment type in each service centre. The results based on this data consisted of groups which differentiated between the larger places, placing the smaller places into one big group. This is not unexpected because the difference in establishment numbers for the various functions found in Lethbridge and Medicine Hat would be greater than that between Youngstown and Cayley. Hence the latter would be placed in one group at the higher or later clustering levels.

(b) The second analysis used a binary (1/0) data input in which only presence or absence of an establishment type (not numbers) in each centre was used. This had the effect of repressing the differences between the larger places, whereas the smaller places were clustered into distinctively separate groups. For example, Calgary and Lethbridge are very close together only because of the number of different functions used in this study (the 83 types are representative of the smaller nodes below the regional or metropolitan level). So it is reasonable to expect that they would form a group at the later cluster stages.

These two preliminary classifications were put together and a final grouping of the data was derived by identifying places with similar pairs of clusters from the two analyses. Table 1 provides an example of the procedure that was adopted. It can be argued that this approach produces an artificial classification since it is derived from two different measures of the same data, focusing on two of the characteristics of the data. The binary clustering is a differentiation based on the *incidence* of the different functions. The interval clustering is a differentiation that stresses the *size differences* of the functions. By juxtaposing the two measures the influence of each factor can be clearly seen in the provisional classifications. It is known (Wishart 1977) that non-hierarchical cluster procedures sometimes produce different results, dependent upon the initial starting position (experience shows this is often in the range of 5% of the cases). So the provisional classification was subjected to another cluster analysis run to check on the consistency of the grouping and border cases were re-allocated accordingly.

TABLE 1

Example of the Two Stage Cluster Approach
to Service Centre Classification

Service Centres	Number of Different Functions	Code of Binary Grouping	Code of Interval Grouping	Combination of Groups	Provisional Classification
Large places					
Calgary	83	4	10	4/10	1
Lethbridge	82	4	2	4/2	2
Red Deer	82	4	2		2
Medicine Hat	83	4	2		2
Brooks	81	4	14	4/14	3
Drumheller	72	4	14		3
Small places					
Youngstown	10	6	3	6/3	7
Benalto Cayley	8	6	3		7
Halkirk	6	6	3		7
Millarville	7	2	3	2/3	8
Rosedale	6	2	3		8
Cayley	5	2	3		8

Once the technical analysis had allocated the individual centres to each grade the basic characteristics of these groups could be determined with respect to the average numbers of establishments or functions typical of these clusters. In the subsequent discussion it must be stressed that *establishment* refers to a separate commercial outlet, a store or office, whereas *function* (a distinctive commercial functional type) describes the specific commercial type: beauty salon, general store etc. So a service centre with a general store, two gas stations, and a hotel, would have four establishments and three functions. The complete set of summary statistics for North and South Alberta can be found in Appendix A. It must be stressed that a function was only considered to be *characteristic* of the grade or cluster if its frequency of occurence in the cluster was over 0.5. (i.e. it is found in more than half the places) and the mean or average for the group was over 0.66. To use an average value of 1.0 for the cut-off criteria would be unduly rigorous. This would mean that all places in a group would have to possess the function (in the absence of two or more functions per place) if 1.0 was chosen as the cut off to identify the function as a characteristic function. The first appearance of a function at a particular grade usually takes place with a single occurance so its absence in one or two towns in a small group of perhaps three or six centres means the function

would not be considered to be typical. Hence a greater than 1 in 3 level of absence was considered to represent a reasonable stopping criterion. It must also be stressed that this level also represented a very real break in the distrbution of average values with a rapid fall-off to values in the 0.4 to 0.3 or below range. Some functions, of course, overlap these criteria, having a mean above 0.6 yet a frequency of occurance below 0.5. The rare examples of functions having such characteristics are identified in Appendix A by the addition of parentheses.

Descriptive titles were given to the groups to reflect the general features of the various levels as well as a Roman numeral system. Occasionally subgroups have been identified. These are groups that are distinguished from their main group simply by size differences in the interval clustering procedure, and are without any real differentiation on functions. As such they were considered to be subgroups of the main type.

Tests on the utility of the grouping were also carried out. The size difference between the places in the analysis - from metropolitan centre to small service node - make it inappropriate to use a single Discriminant Analysis even using several discriminant functions. After all, it is *most* improbable that linear discriminant functions will provide good fits to the whole data set, given the number of functional indicators involved and the extreme size differences between the settlements. Instead two separate Discriminant Analyses were carried out: one on the three smallest groups and another the largest five groups.The obvious differences in the incidence of functions between the smaller and the larger towns means that it is pointless to use the highly specialized variables as indicators of differences between the groups in the smaller towns: after all they will rarely be present in the minor settlements. In any case these create a practical problem in the calculation of the discriminant functions; rows or columns of similar values - such as a set of zeros for commercial functions not found in a pair of groups - make it impossible to invert the matrices and to calculate the eigenvalues upon which the discriminant functions are based. This problem was resolved by calculating the discriminant functions only for the variables that differentiated the groups in the preliminary classification.

Many different methods can be used to obtain the discriminant functions. There is no intuitive reason why one variable should be more important than another, so the Direct Analysis approach, using all appropriate variables for the groups concerned, was preferred. Stepwise methods, of course, select the higher loading variables first, usually up to a defined level of explanation. Since the testing procedure is being used to evaluate the utility of the cluster groups - in which *all* the variables were used by the

Euclidean Distance similarity measure - the stepwise methods seem inappropriate for this type of problem.

TABLE 2

Discriminant Tests of the Utility of the Groups

(a) S. ALBERTA			After Function Removed:				Classification
Groups in Test	Functions Used	Eigenvalue Expressed as Percent Variation	Wilk's Lambda	Chi Square	Degrees Freedom	Significance Level	Accuracy Number and % of Cases
I to V	1	96.51	0.000	888.8	235	0.00	
	2	3.38	0.000	563.6	184	0.00	53/53
	3	0.09	0.015	323.9	135	0.00	=100%
VI to VIII							
	1	81.01	0.085	246.8	40	0.00	103/113
	2	18.99	0.481	73.6	19	0.00	=91.05%
(a) N. ALBERTA			After Function Removed:				Classification
Groups in Test	Functions Used	Eigenvalue Expressed as Percent Variation	Wilk's Lambda	Chi Square	Degrees Freedom	Significance Level	Accuracy Number and % of Cases
I to V							
	1	99.29	0.000	540.06	198	0.00	82/83=
	2	0.66	0.004	259.74	130	0.00	=98.80%
VI to VIII							
	1	86.62	0.121	239.82	44	0.00	117/127=
	2	13.82	0.608	56.54	21	0.00	=92.13%

An important advantage of this type of Discriminant Analysis testing is that all places in each set of clusters are arranged along a small number of Discriminant functions instead of the 83 variables. The Eigenvalues (or rather the equivalent in percentage explanation of the variance figures) and the Wilk's Lambda values are shown in Table 2. These measure the explanation and significance levels for the discriminant functions extracted in two analyses. Wilk's Lambda is an index of the completeness of the discriminant functions in summarizing the variability in the data: the nearer the value to 0.00 the higher the level of explanation or or the amount of variability 'soaked up' by the function. Since a *complete* population of settlements in an area was being used,

instead of the random sample assumed by the discriminant tests, the significance measures *cannot* be interpreted rigorously. Instead, they should only be regarded as guides to the utility of the classification. Another useful feature of the Discriminant Analysis approach is that once each service centre in the comparison of the groups is arranged along the discriminant functions (each of which summarizes a particular pattern in the data), those places misclassified by the initial allocation of groups can be identified. It must be stressed that it is theoretically possible to find a high degree of differentiation between the results of the Cluster Analysis procedures and the Discriminant Analysis approach used here. After all, the latter is based on a *linear* function fitted to the groups, in which the unique variance is ignored, and in the case of the smaller groups only relates to a part of the data matrix, namely those variables which differentiate the groups. This means that only part of the total variance enters the discriminant description. By contrast, the Cluster Analysis uses all the information in the data matrix. The decision was made to place most reliance on the Cluster Analysis results, using the Discriminant Analysis to show how different the groups were, and then to pinpoint the centres which appeared to be misclassified in the results. These centres were considered to be marginal members of the clusters since they shifted groups when the different technical procedures were adopted.

Table 2 shows that all the discriminant functions for the various groups display high levels of explanation. This means that the differentiating power of the preliminary Cluster Analysis classification proved to be strong. Not surprisingly, perhaps, the lower explanation levels are found in the tests for the smaller places, where deviations caused by 'missing' variables in individual towns, or the presence of above above average variables of a particular function in a settlement, provide higher levels of variability. In total , however, the Discriminant Analysis for the two groups of smaller towns still provided over 90% agreement with the Cluster Analysis results. Taking the four Discriminant Analyses together, that is for North and South Alberta, only 5% of the 376 places would be re-assigned on the basis of this procedure, a highly satisfactory result given the variation in the data set. Subsequent discriminant tests based on the partwise comparison of each cluster set using single discriminant functions, provided very similar results in total, re-confirming the utility of the grouping that has been established.

Tables 3 and 4 show the composition of the eight main groups that were identified, in terms of the places that are found at each level. Once this classification of places had been achieved the characteristics of these groups in terms of the number of establishments and types of typical functions could be identified.

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Table 3

Groups of Southern Alberta Service Centres

GRADE I METROPOLITAN (1)

1. Calgary

GRADE II REGIONAL (3)

1. Lethbridge
2. Medicine Hat
3. Red Deer

GRADE III SUB-REGIONAL (10)

1. Brooks
2. Drumheller
3. Rocky Mountain House
4. Taber
5. Stettler
6. Olds
7. Lacombe
8. High River
9. Innisfail
10. Claresholm

GRADE IV DISTRICT (19)

1. Coaldale
2. Airdrie
3. Canmore
4. Cochrane
5. Okotoks
6. Pincher Creek
7. Hanna
8. Ft. Macleod
9. Cardston
10. Strathmore
11. Sylvan Lake
12. Didsbury
13. Sundre
14. Blairmore
15. Three Hills
16. Vulcan
17. Nanton
18. Coronation
19. Bassano

GRADE V SUB DISTRICT (14)

(A)

1. Redcliff
2. Carstairs
3. Castor
4. Magrath
5. Coleman

(B)

1. Bow Island
2. Eckville
3. Crossfield
4. Picture Butte
5. Oyen
6. Vauxhall
7. Raymond
8. Trochu
9. Turner Valley
10. Milk River
11. Bentley
12. Beiseker
13. Consort
14. Alix

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GRADE VI LARGE LOCAL SERVICE (11)

1. Blackfalds
2. Black Diamond
3. Bowden
4. Delburne
5. Bragg Creek
6. Formost
7. Caroline
8. Acme
9. Penhold (*7)
10. Carbon
11. Bellevue

GRADE VII LOCAL SERVICE CENTRES (52)

1. Waterton Park
2. Linden
3. Coutts
4. Warner
5. Lake Louise
6. Stavely
7. Duchess
8. Longview
9. Rockyford
10. Veteran
11. Cremona
12. Coalhurst
13. Blackie
14. Mirror
15. Cowley
16. Barons
17. Gleichen
18. Langdon
19. Lomond
20. Irricana
21. Donalda
22. Tilley
23. Standard
24. Delia
25. Pine Lake
26. Nobleford
27. Big Valley
28. Torrington
29. Carmangay
30. Grassy Lake
31. Hussar
32. Cereal
33. Spruce View
34. Champion
35. Arrowwood
36. Irvine
37. RollingHills (*8)
38. Granum
39. Elnora
40. Carseland
41. Youngstown
42. Rosemary (*8)
43. Milo
44. Empress (*8)
45. Leslieville (*8)
46. Shaughnesy
47. Manyberries
48. Wimborne (*8)
49. Enchant (*8)
50. Cluny (*8)
51. Benalto
52. Halkirk (*8)

GRADE VIII MINOR CENTRES (50)

1. DeWinton
2. Burdett
3. Stirling
4. Barnwell
5. Rosedale
6. Mountain View
7. Clive
8. Lundbreck
9. Dunmore
10. Millarville
11. Hillcrest
12. Frank
13. Standoff
14. Iron Springs
15. Botha
16. Cayley
17. Glenwood
18. Hilda
19. Acadia Valley
20. Condor
21. Gadsby
22. Erskine
23. Lundbreck
24. Diamond City
25. Brocket
26. Etzikom
27. Morrin
28. Rumsey
29. Nacmine
30. Swalwell
31. East Coulee
32. Wrentham
33. Turin
34. Hays
35. Hill Spring
36. Pincher Station
37. Elkwater
38. Compeer
39. Gull Lake
40. Madden
41. Huxley
42. Spring Coulee
43. Mossleigh
44. Ralston
45. Walsh
46. Craigmyle
47. Sibbald
48. Altario
49. Byemoor
50. Westward Ho

(*8) Places that changed groups - grade shown by number - in the Discriminant Analysis

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Table 4

Groups of Northern Alberta Service Centres

GRADE I METROPOLITAN (1)

1. Edmonton

GRADE II REGIONAL AND SATELLITE (4)

1. Grande Prairie
2. Sherwood Park
3. St. Albert
4. Ft. McMurray

GRADE III SUB-REGIONAL (19)

1. Lloydminister
2. Camrose
3. Wetaskawin
4. Leduc
5. Spruce Grove
6. Peace River
7. Edson
8. Hinton
9. Ft. Saskatchewan
10. Drayton Valley
11. St. Paul
12. Westlock
13. Bonnyville
14. Barrhead
15. Ponoka
16. Vegreville
17. Grande Centre
18. Vermillion
19. Athabasca

GRADE 1V DISTRICT (28)

(A) Large

1. Wainwright
2. High Prairie
3. Morrinville
4. Stoney Plain
5. Whitecourt
6. Slave Lake
7. Jasper
8. Nisku
9. Fairview
10. Valleyview
11. High Level

(B)

1. Grimshaw
2. Beaverlodge
3. Lac La Biche
4. Rimbey
5. Devon
6. Tofield
7. Provost
8. Red Water
9. Viking
10. Two Hills
11. Smoky Lake
12. Spirit River

(C)

1. Manning
2. Grande Cache
3. Mayerthorpe
4. Swan Hills
5. Onoway

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V SUB-DISTRICT (31)

(A) Large

1.	Elk Point	6.	Thorsby	11.	Forestburg
2.	Bashaw	7.	Killam	12.	Sexsmith
3.	Falher	8.	Boyle	13.	Hardisty
4.	Lamont	9.	Daysland	14.	Andrew
5.	Glendon	10.	Gibbons	15.	McLennan

(B) Small

1.	Beaumont	7.	Breton	12.	Legal
2.	Fox Creek	8.	Hythe	13.	Vilna
3.	Evansbug	9.	Calmar	14.	Mundare
4.	Thorhild	10.	Cold Lake	15.	Myrnam
5.	Warburg	11.	Holden	16.	La Crete
6.	Mannville				

VI LARGE LOCAL SERVICE (18)

1.	Ft. Vermillion	7.	Sangudo	13.	Clyde (*7)
2.	Androssan	8.	Berwyn	14.	Plamondon
3.	Namao	9.	Hughenden	15.	Ryley
4.	Millet	10.	Bruderheim	16.	Irma
5.	Rycroft	11.	Edgerton	17.	Lougheed (*7)
6.	Sedgewick	12.	Wembley	18.	Marwayne

VII LOCAL SERVICE (57)

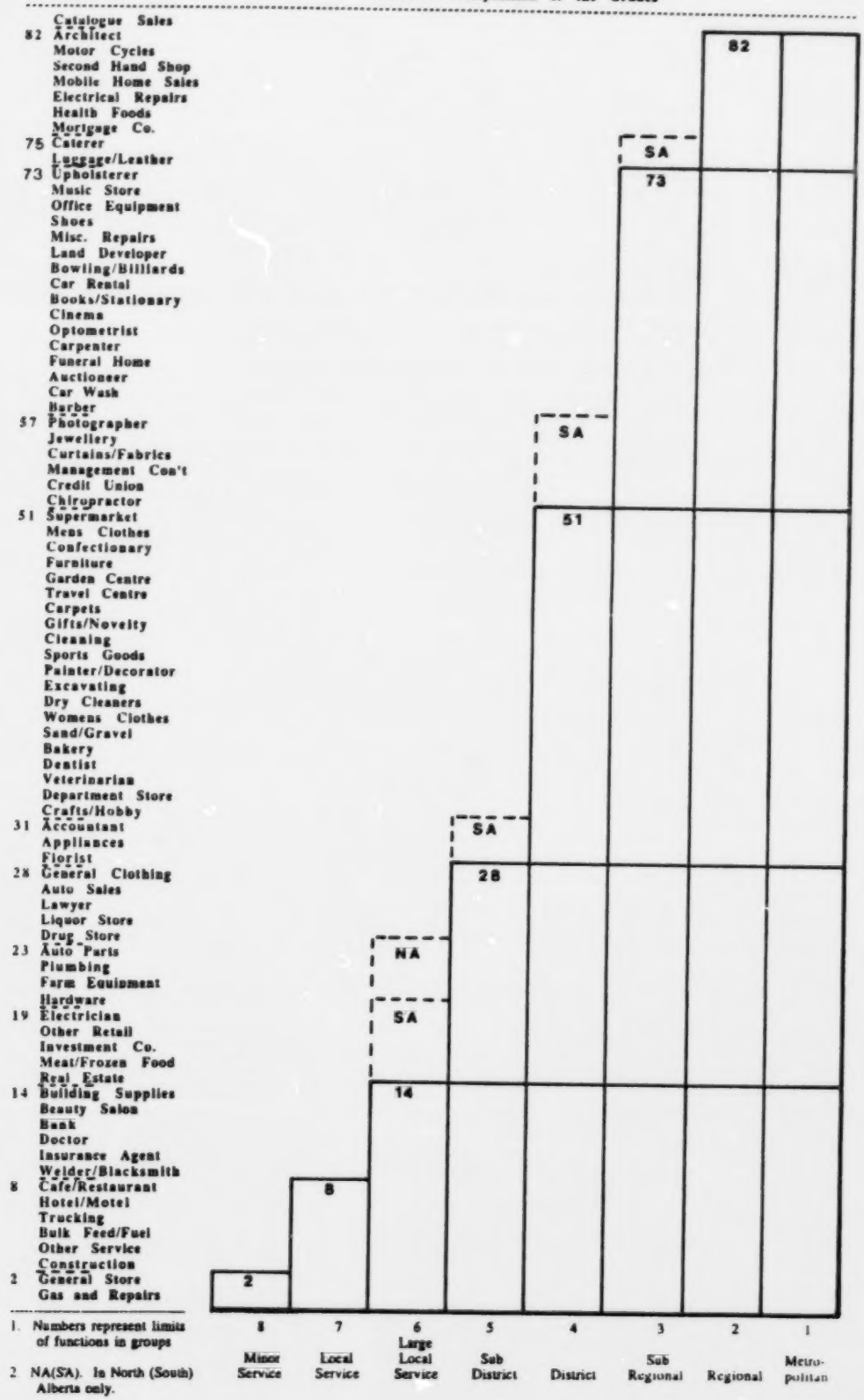
1.	Nampa	20.	Eaglesham	39.	Bruce
2.	Wabamum (*6)	21.	Newbrook	40.	Rochester
3.	Hines Creek	22.	Debolt	41.	Radway
4.	New Sarepta	23.	Alliance	42.	Buck Lake
5.	Bon Accord	24.	Donelly	43.	Strome (*8)
6.	Hobbema	25.	Kitscoty	44.	Hay Lakes
7.	Ashmont	26.	Wanham	45.	Derwent
8.	Wildwood	27.	Blue Ridge	46.	Ma-Me-O Beach
9.	Innisfree	28.	Mallaig	47.	Lodgepole
10.	Entwhistle	29.	Clairmont	48.	Ft. Assiniboine
11.	Rainbow Lake	30.	Kinuso	49.	Willingdon
12.	Ninton Junction	31.	Smith	50.	Tomahawk
13.	Peers	32.	Wandering River	51.	Amisk (*8)
14.	Winfield	33.	Czar	52.	Brownvale
15.	Alberta Beach	34.	Chauvin	53.	Heisler
16.	Ft. Chipewan	35.	Worseley (*8)	54.	Mulhurst (*8)
17.	Waskatenau	36.	Hairy Hills	55.	Bawlf
18.	Girouxville	37.	Alder Flats	56.	Ellerslie (*8)
19.	Jarvie	38.	La Glace	57.	New Norway

VIII MINOR SERVICE CENTRES (52)

1.	Bluffton	19.	Edberg	36.	Beauvallon
2.	Calahoo	20.	Cadomin	37.	Islay
3.	Kinsella	21.	Faust	38.	Woking
4.	Ardmore (*7)	22.	Minburn	39.	Cherhill
5.	Seba Beach	23.	Warspite	40.	Gunn
6.	Dewberry	24.	Gwynne	41.	Ohaton
7.	Grassland	25.	Armena	42.	Canyon Creek
8.	Duffield	26.	St. Lina	43.	Pickardville
9.	Colington	27.	Paradise Valley	44.	Fabyan
10.	Fawcett (*7)	28.	Keg River	45.	Ranfurly
11.	Galahad	29.	Roundhill	46.	Spedden
12.	Rosalind	30.	Rochfort Bridge	47.	Heinsburg
13.	Darwell	31.	Ferintosh	48.	Villeneuve
14.	Chipman	32.	Robb	49.	Alcomdale
15.	Lavoy	33.	Joussard	50.	Meeting Creek
16.	Sunnybrook	34.	Vimy	51.	Blackfoot
17.	Rollyview	35.	Clandonald	52.	St. Michael

(*8) Places that changed groups - grade shown by number in the Discriminant Analysis.

FIGURE 1 Functional Composition of the Groups



1. Numbers represent limits of functions in groups

2 NA(SA). In North (South) Alberta only.

(a) Hierarchical Structure of the Functions

One of the most fundamental characteristics of the distribution of service centres in rural areas - identified in both empirical and theoretical structures - is the concept of the hierarchy. This is an arrangement of commercial functions such that each larger grade of centre is distinguished by a new set of functions whilst those functions found at a lower order are also present with greater frequency in higher order places. Figure 1 (derived from the complete summary in Appendix A) simply takes the new or characteristic functions at each level and arranges them in sequence. The organization of the characteristic functions in this way leads to two major conclusions.

1. Figure 1 shows that, on average, the hierarchical arrangement of functions is still present among the service centres of the province. All but one of the 83 functional types correspond to this general tendency. The exception is the function 'catalogue sales', those outlets for the mail order outlets of metropolitan department stores that are now only found relatively infrequently in the smaller centres. In retrospect this function should have been excluded from the analysis.
2. The number of new functions at each hierarchical level is not identical for there are some variations from grade to grade, with some differences between North and South Alberta. Yet the differences are not great enough to destroy the basic similarity between the two sets of results.
   (a) If only the core of functions at each grade is considered (i.e. present in both North and South Alberta) there is an approximate doubling in the number of functional types between each grade in Groups VII and IV (or Local Service to District Centres) namely 8, 14, 28, 51. At the top end of the scale no difference in the number of types of functions is found between the Regional and Metropolitan groups. This, however, must be attributed to the restriction of the study to 83 functional types: in other words it must be remembered that the extreme specialization of commercial activity in the largest centres was not taken into account in this study.
   (b) In three out of the four cases (Groups V to III) in which there are differences between the functional types found in North and South Alberta the advantage lies with South Alberta. This means that centres in the south of the province have, on average, more functions. The difference must not be exaggerated; they only range between two and six extra

functions, a small part of the total functional equipment of the towns. The exception lies with Group VI, Large Local Service Centres, where the fourteen functions found in the towns of both metropolitan areas are joined by five extra in Southern Alberta and four different ones in Northern Alberta. This level of place seems to identify a transitional grade between the Local Service and Sub District categories.

(c) The increase in the size of the functions at successively higher levels could not be displayed in Figure 1. Appendix A, however, shows that the vast majority of functions have higher average numbers in the higher hierarchical levels in the progression from low to high order centres. Nevertheless there are some exceptions. However only 4.5% of the cell entries of characteristic functions between the grades display a decrease rather than an increase in these numbers at each successive size level in Southern Alberta; the corresponding figure is 2.6% in Northern Alberta.

Although the finding of a hierarchical sequence of functions in the groups of Alberta service centres confirms previous empirical work it does contradict recent studies of Canadian rural services by Dahms (1980) and Meredith (1975). These studies, in Ontario and Saskatchewan respectively, have pointed to the emergence of specialized centres in agricultural areas, in which one centre out of a set of nodes specializes in a particular commercial activity, whereas its neighbour is specialized in another function. In many ways this is a revival of the dispersed city concept. Clements (1977), in a review of this idea, found little support for the concept. However there seems to be little doubt that some commercial activities may conform to this pattern of specialization, with certain towns having high concentrations of a particular type of activity or by an extra large business of a particular type. Probably the classic Prairie cases are found in the cluster of car dealers in Altona (Manitoba) or the large recreational vehicle complex in North Battleford (Saskatchewan). Also there are always fluctuations around the norm of the hierarchical grades, for it is likely that individual functions may be stronger in one town than others, due to past historical development or aggressive entrepreneurship on the part of an individual company. In general, however, the results of this study lead one to caution against acceptance of the specialization concept in rural service centres. There is no real evidence in the Alberta case for the presence of sets of specialized towns in the province, such that consumers have to shop around between a set of low order centres in which the different higher order functions are found: functions, perhaps, which might have been thought to form a 'missing' level

of the hierarchy. This is not to deny that individual towns may have missing functions, types that should be typical of the level, but such gaps were more than outweighed by the numbers of similar or hierarchical functional types in the centres.

Figure 1 only deals with the typical functional composition of each grade of centre. As such, it underestimates the actual numbers of functions found in each group, and the total number of establishments typically found in centres of a particular level. This is because many centres have more than one example of a particular function, may not have representatives of a standard type, or may have occasional functions that are typical of a higher grade. In other words, recognition of the hierarchical sequence in Figure 1 does not mean that a rigid hierarchical arrangement is typical of all centres. Table 5 summarizes the other characteristics of the centres. It provides information on the *average number of different functions* found at each grade and the *average numbers of establishments*. Three conclusions can be derived from Table 5.

1. The three lowest grades of place show, on average, three or four more functions than expected from the arrangement of characteristic functions identified in Figure 1. This meant that many of the individual centres at these lowest levels contain a scatter of functions more typical of higher order places. Nevertheless, they are *not* present in sufficient numbers in any centre to raise these places to the next level. This illustrates the variability in the functional composition of the smaller nodes in the province.
2. Differences also occur between the number of establishments at each level or grade. At the lowest grade of all there is a similarity between the average number of establishments and functions - simply because most places only have one store of a particular type. At higher hierarchical levels the number of establishments of a particular functional type increases. The result is that the ratio between functions and establishments increases in size, from a 1:2 value at the Large Local Service and Sub District levels to over 1:4 at the Sub Regional grade.
3. The average number of establishments found in many of the grades of centre varies between South and North Alberta. At the Regional Service Centre level the Southern Alberta centres are much bigger and are almost twice the size of those in Northern Alberta when measured in total numbers of establishments or commercial outlets, though the number of

TABLE 5

AVERAGE VALUES FOR THE GROUPS IN NORTH AND SOUTH ALBERTA

	Number of Places (mean)			Average Establishments		Average Functions (mean)		Hierarchical Functions		Mean Population	
Grades	Total	S.A.	N.A.	S.A.	N.A.	S.A.	N.A.	S.A.	N.A.	S.A.	N.A.
I Metropolitan	2	1	1	18938	16352	83	83	82	82	625,143	560,085
II Regional & Satellite	7	3	4	2028	912.5	82.3	80	82	82	52,620	35,897
IIIa Sub-Regional	29	10	19	304.5	355.1	71.5	72.5	75	73	5,435	6,043
IIIb Specialized	1	1	N/F	402.1	N/F	62.0	N/F	N/A	N/F		
IV District	47	19	28	162.9	143.3	57.9	51.5	57	51	3,530	2,242
V Sub District	50	19	31	66.6	49.7	35.4	30.5	31	28	1,123	799
VI Large Local	29	11	18	37.4	40.9	23.5	23.7	19	18	617	544
VII Local Service	109	52	57	16.4	18.0	11.9	12.6	8	8	350	286
VIII Minor Service	102	50	52	5.8	5.9	5.1	5.2	2	2	N/A*	N/A*

S.A. Southern Alberta
N.A. Northern Alberta

N/F Not Found
N/A Not Appropriate

*Population figures (1985) for Grade VIII centres were not available from Alberta Bureau of Statistics for most of the centres in this group since many are unincorporated. Population figures for the metropolitan areas are for the political area.

different functions is virtually the same. Indeed, the Northern Alberta centres are more appropriately regarded as a group subset, or IIb centres, perhaps better described as Small Regional and Satellite Centres. By way of compensation for this difference it is the North Alberta Grade III centres which are much bigger than those in the south, presumably because these Sub Regional centres of Northern Alberta do not face so much competition from the Regional and Satellite centres. This alternate reversal in size as one descends the hierarchy also occurs at the next level of Group IV, where the District Centres of Southern Alberta are larger than their equivalent to the north, a feature which is also found at the Sub-District level Group V. Again the situation is reversed at the Large Local and Local Service levels although the Northern Alberta advantage at these grades is relatively small. Yet apart from the Regional level centres, the differences between North and South should not be exaggerated. In general each cluster or grade of place in North and South Alberta is more similar to each other than to the other grades in the province.

THE SPACING OF THE GRADES OF CENTRES

The uniformity assumptions of central place theory provide a rigid framework that accounts for the regularity in the spacing of centres in theoretical studies (Christaller 1932, 1964). In a real world context, of course, such regularity in the pattern of centres cannot be expected, due to factors such as the influence of unequal resource distributions, the location of routeways and the differential effect of historical events. At first sight, therefore, Figure 2, the map of Alberta centres graded by service centre importance displays little regularity. Nevertheless, the spacing of service centres in Alberta shown in Figure 2 reveals some uniformities in the distribution of many of the higher order service centres. These regularities provide some spatial keys that help unlock the apparently random distribution of the various grades, in at least the main agricultural area of the province i.e. basically south of a Westlock-St. Paul axis. These general tendencies are identified in Figure 3 by the addition of a set of trend lines or metropolitan field isopleths (lines joining centres of equal size at various distances from the major centres) to the basic map of grades of centre. It must be emphasized that the account that follows is based on a *description* of the spatial pattern of nodes, *not* upon a rigorous quantitative analysis of the spacing. In describing these patterns, a

distinction must be made between the *absolute location* of places, based on their sites, and the *relative location*, the position of a place relative to other centres, especially those of similar size.

A. Absolute Location of the Service Centres

The most obvious regularity in the absolute location of service centres in Alberta comes from the way the centres are associated with the major routeways in the province. Many Alberta service centres, therefore, are distributed like beads on a necklace, the controlling influence being the location of the major highways, although historically these routeways were often preceded by the railways. This linear orientation is most clearly seen southeast of Edmonton, where a repetitive series set of centres are associated with major highways such as 12, 13, and 14. However, dominating the overall pattern is the large number of places along Highway 2, from Edmonton through Calgary to Ft. Macleod, a routeway that has a very significant concentration of higher order centres in the province. The concentration of high order centres along Highway 2 is a function of several factors:

(a) the early historic start of the centres in this transportation zone (since Highway 2 was proceeded by other routeways, the towns were able to capture the trade of potential competitors;

(b) the absence of many competitors to the west where the lower density of population has discouraged the growth of many significant competitors;

(c) the growth impetus provided by the presence of additional of economic functions to the centres activities other than commercial functions (such as gas and industrial plants);

(d) the spill-over effects from the two major metropolitan nodes and the benefits provided by easy access to these nodes along this major routeway.

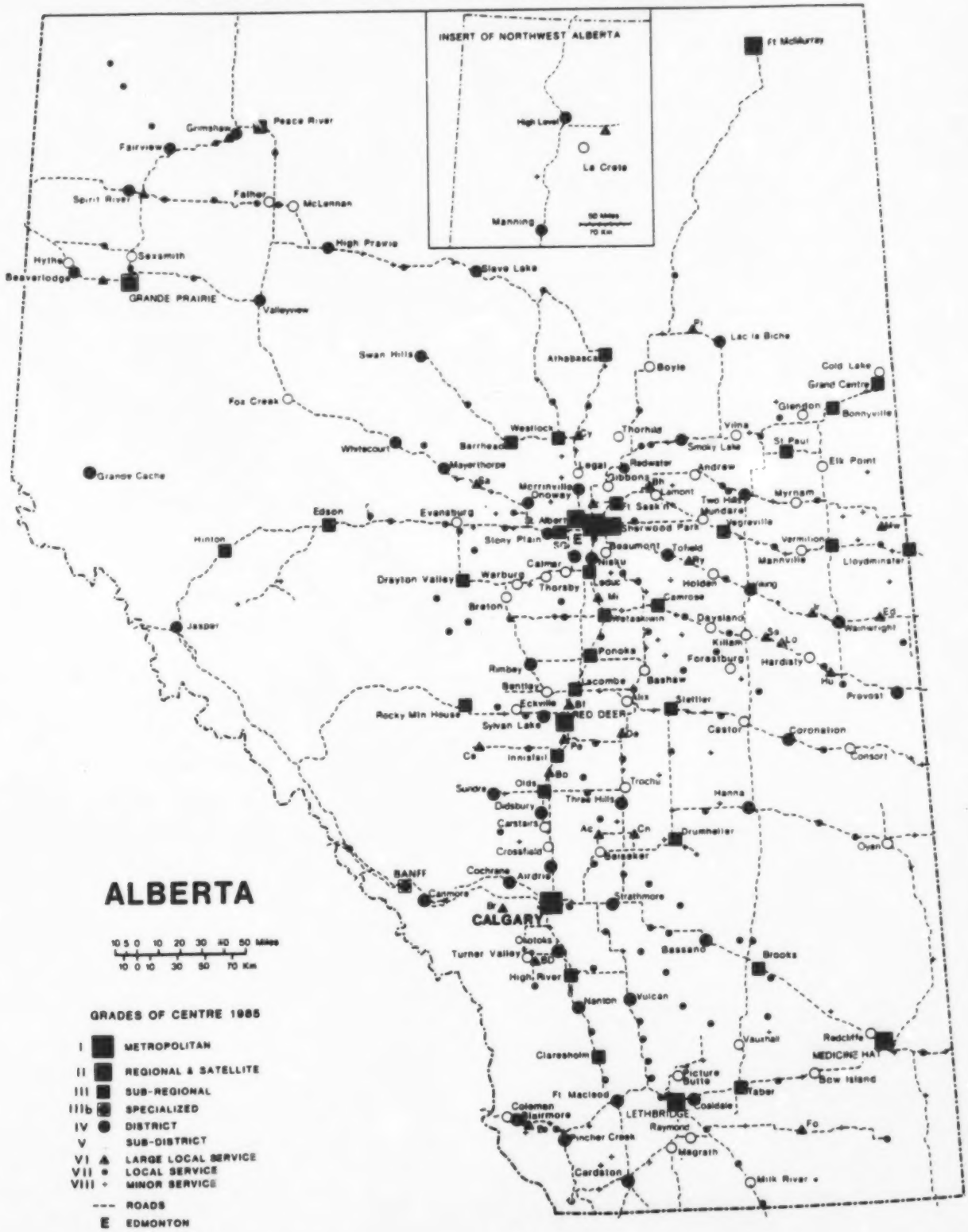
Another major north-south line of nodes can also be identified in the province, this time along Highways 21 and 23 , approximately 50 km to the east of Highway 2.The competition from the Edmonton-Ft. Macleod corridor and the lower population densities to the east of this zone ensure that this set of nodes consists of places of much lower status.

B. Relative Location of Service Centres

The second way of interpreting of the spatial pattern of centres in Alberta is by focusing upon the *relative location* of central places, particularly the way in which centres of similar grades are distributed with respect to one another.

The Differentiation of Alberta Service Centres, 1985
FIGURE 2

DISTRIBUTION OF GRADES OF SERVICE CENTRE, ALBERTA 1985



1. Metropolitan and Regional Nodes

The two metropolitan centres of Calgary and Edmonton, and the largest regional nodes (Lethbridge and Red Deer), are all located 160-200 km from one another. This has produced a basic historical uniformity in spacing among the higher order centres of the province. The regularity breaks down to the east where the next largest Places are the Grade II centre of Medicine Hat or the Grade III node of Lloydminister. These are 260-280 km away from their nearest higher order or equivalent sized centres. (Lloydminister was not identified as a second order centre in this Alberta study, although if the functions present in the Saskatchewan part of the built-up area is included as well such a designation might well be appropriate). The historic pattern has been disrupted even more in recent years by the growth of four centres to small Grade II or second order status, namely the Edmonton satellite centres of Sherwood Park and St. Albert, as well as the northern nodes of Grande Prairie and Ft. McMurray, to the status of small second order centres. All four places have representatives of almost all the 83 functions used in this study but have much smaller numbers of establishments in each functional type when compared to Lethbridge, Red Deer and Medicine Hat.

2. Patterns around Metropolitan Centres

The concentration of nodes along the major highways leading from the metropolitan centres does impart a basic linearity to the pattern of centres. However, many, although not all of the 3rd, 4th, and 5th order centres can be seen in Figures 2 and 3 as being distributed as a set of rings around the metropolitan nodes. These rings, perhaps more correctly described as a set of oval shaped distributions, are elongated east-west and compressed north-west, and are more extensive around Edmonton than Calgary. It must be emphasized that these rings are certainly not complete in all cases, and lower order individual centres often disrupt the uniformity. Nevertheless, these maps provide a key that help one to understand the scatter of central places in the province.

(a) Edmonton. Three sets of structures, dominated by third order or Group III centres, can be identified in the metropolitan field or hinterland of Edmonton.

(i) The most complex structure is found closest to Edmonton and is the most incomplete spatial pattern. It consists of three Group III centres, Ft.

Saskatchewan, Leduc and Spruce Grove, some 20-30 km from the centre of Edmonton. Gaps in the distribution of these third order nodes are seen to the northwest and east, where St. Albert and Sherwood Park, both located closer to the city, have grown to the Group II or Regional and Satellite grade.

(ii) A middle ring of Grade III places, composed of Barrhead, Westlock, Vegreville, Camrose, Wetaskwin and Drayton Valley, is located some 60-110 km from Edmonton. They are not equally spaced from one another, since Barrhead and Westlock, as well as Wetaskwin and Camrose, are located in relatively close proximity to each other, with an obvious gap in the distribution to the northeast, where Smoky Lake is only a 4th order node.

(iii) An outer ring or rather oval of places, composed of Athabasca, St. Paul, Vermillion, Stettler, Lacombe, Rocky Mountain House and Edson, completes the Edmonton regional pattern. These centres are located some 180 km from the metropolis on average, ranging from 90 km in the case of Ponoka, to 200-220 km in case of Vermillion and Edson. The greater gaps between the centres at this grade in the west and north is understandable, given the absence of lower order nodes in the largely forested area, a zone uninhabitated except for a scatter of relatively large resource towns.

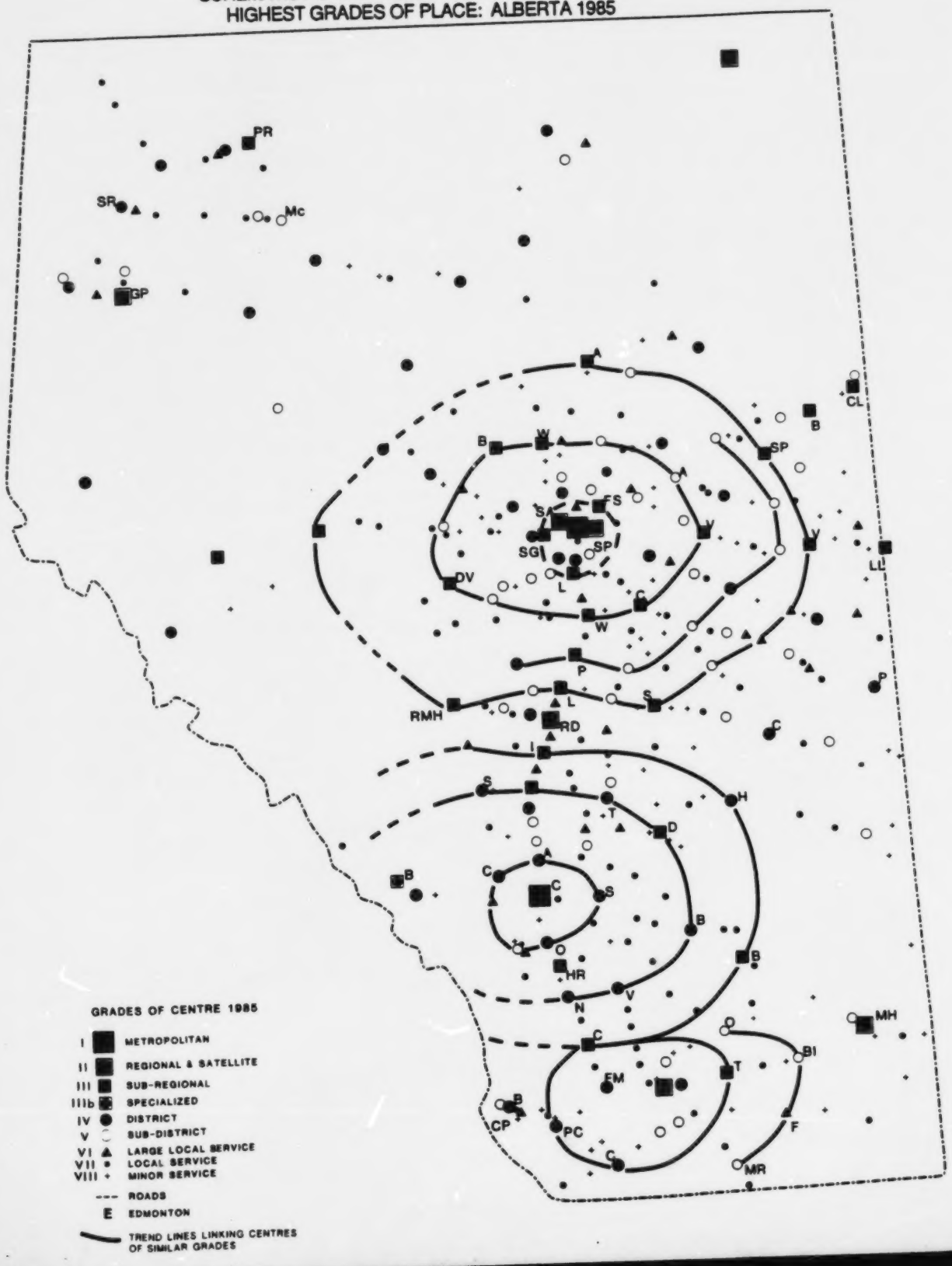
The distribution of centres *between* these three rings does not correspond to any simple pattern. There is a discontinuous scatter of IVth and Vth order nodes between the second and third rings, from Rimbey east and northeast in the agricultural belt to Vilna, with one centre, Ponoka, at the IIIrd order level. Again the absence of many similar sized centres to the west and north, at a similar distance zone, is a direct function of the fact that this is largely a forested area of low population density and hence limited trade potential. In addition, there is a suggestion of a half circle of IVth and Vth order nodes between Rings 1 and 2, around Edmonton, from Morrinville in the west to Tofield in the southeast.

(b) Calgary Region. Identification of a series of rings of higher order centres around Calgary is much more difficult, because the Foothills and Rocky Mountains cut off the continuity of the patterns in the west. In addition, the presence of Alberta's Dry Belt to the east reduces population density, which produces much lower grade centres in this area than might be expected from purely distance considerations.

The Differentiation of Alberta Service Centres, 1985

FIGURE 3

SCHEMATIC PORTRAYAL OF RELATIVE LOCATION OF HIGHEST GRADES OF PLACE: ALBERTA 1985



(i) A discontinuous ring of IVth order nodes - Cochrane, Airdrie, Strathmore and Okotoks - lie between 25 and 40 km from Calgary, with the inevitable gap to the west, where Bragg Creek has only attained a VIth order ranking. The relatively low grade of these places provides a stark contrast to the cluster of higher order nodes around Edmonton at rather closer distances.

(ii) Another discontinuous, and more varied ring of IIIrd and IVth order nodes can be identified between 75 and 110 km from Calgary. Olds, Drumheller and Banff act as 3rd order centres (the latter being a Specialized IIIrd order node) with Sundre, Three Hills, Bassano, Vulcan and Nanton reaching IV order status. Again the fact there are no IIIrd or IVth order centres to the southwest is a simple function of the latest population densities, a function of the physical conditions. The absence of a IVth order node to the south and southeast at this distance zone seems related to two issures. First, the way the intervening centre of High River has developed as a satellite of Calgary, capturing higher order trade to the south. Second, the fact that there are lower population densities (and hence lower threshold populations) to the east and southeast.

(iii) A far less distinct and certainly only partial set of IIIrd order nodes can be found between 120 and 180 km from Calgary, this time represented by Claresholm, Brooks and Innisfail. Hanna fails to make the expected grade, principally because the low population densities in its hinterland has reduced the opportunity for this centre to obtain sufficient third order functions.

3. Patterns Around Regional Centres

(a) Lethbridge Region. The spatial pattern of higher order centres around Lethbridge fails to conform to any simple pattern but three general features need to be recognized.

(i) There is a suggestion of a ring of third and fourth order centres approximately 50 and 90 km from this regional centre. It overlaps the outer Calgary zone and is represented by the third order nodes of Claresholm and Taber to the north and east, and the fourth order centres of Pincher Creek and Cardston to the southwest. A conspicuous gap occurs

to the southeast, where Warner only attains a VIIth grade status; whilst even Milk River, further south, only reaches the Vth grade.

(ii) Inside the previous zone is a mixed set of different sized centres, with two third order centres - the satellite of Coaldale, and the historic core of the region, Ft. Macleod - and three fifth order nodes: Picture Butte, Magrath and Raymond.

(iii) Outside the zone is the complex set of 4th to 7th order centres ranging from those in the Crowsnest Pass and to a half moon shaped set of 5th order nodes, running from Vauxhall, through Bow Island, Foremost to Milk River.

(b) Red Deer Region. The distribution of higher order centres around Red Deer has already been implied in the discussion on Calgary and Edmonton since it lies between the outer ring of third order places of these metropolitan centres.

An important feature of the Red Deer area is the presence of six IIIrd order places within 90 km of Red Deer. Stettler and Rocky Mountain House are the most distant, to the east and west respectively, with Olds and Innisfail in close proximity along Highway 2 to the south, and Ponoka and Lacombe in similar juxtaposition to the north. This repetition of centres along the major routeways, rather than the uniform spacing implied by theoretical ideas, is an important characteristic of the overall distribution pattern in this region.

(c) Medicine Hat Region. With the exception of the Vth order satellite centre of Redcliff there are no high order centres in the vicinity of Medicine Hat, clearly a function of the very limited rural population densities in this part of Alberta.

(d) Other Regions. The absence of any high order centres in the dry belt of the east central part of the province is another striking feature of Figures 2 and 3. Oyen, a Vth order node, provides the only real exception. North of this region, the linearity of places along Highways 12, 13 and 14 is

noticeable, with the characteristic of a repetition of places of almost equivalent size in these zones, such as the Vth and VIth order centres along Highway 13.

The distribution of centres in the Peace River region and other parts of Northern Alberta does not conform to any simple pattern. The surprising feature, perhaps, for such a sparsely populated area, is the way small clusters of centres of different size have developed in relatively close proximity to one another: such as in the Berwyn, Grimshaw, Peace River area, or the McLennan and Fahler district, and in the Grande Prairie, Sexsmith, Beaverlodge region

CONCLUSION

The objective of this study has been to produce a quantitative classification of service centres in the rural areas of Alberta using a comprehensive set of commercial categories to identify the characteristics of these centres. As such the study attempts to provide a contemporary province-wide bench mark of the location and importance of each node in Alberta. Given the ever present possibility of obtaining alternative classifications, due to the technical dependence of particular statistical methods, it was considered vitally important to justify the choice of techniques and the data used. Only if these procedures are considered satisfactory - in the context of the explicit limitations described in the introduction - can the results be used to produce viable conclusions about the characteristics of the Alberta service centre system.

1. The two most important parts of the study are:

   (a) the identification of eight grades of service centre and the isolation of the typical commercial functions (or complex of functions) found at each level;

   (b) the distribution of these centres in the province.

2. From this quantitative basis the study concluded that a hierarchical system of service centres is still the most useful way of summarizing their characteristics in the province, whilst glimpses of a systematic spacing linked to rings of centres of equivalent grade can be found in the metropolitan fields, although the Edmonton and Calgary regions have very different service centre characteristics. It is anticipated that future work in this general topic area will be devoted to a re-analysis of the 1977 Alberta service centre system applying the same techniques as these used here for comparability. This will make it possible to identify the recent, short-run changes in the province (1977-85), as well as

provide an analysis of population excess and deficiency relationships for the principal service centres.

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APPENDIX A (1)NUMBER OF ESTABLISHMENTS AT EACH GRADE OF PLACE: SOUTHERN ALBERTA 1986

Mean values (>0.6) of the Number of Commercial Variables in the Groups of Towns

		8	7	6	5	4	3b	3a	2	1
Variables		Minor Service	Local Service	Large Local Service	Sub-District	District	(Banff)	Sub-Regional	Regional	Metropolitan
1	Gas and Repairs	0.71	1.79	2.73	5.61	8.66	10.50	18.86	77.83	743.00
2	General Store	0.65	1.24	1.77	2.45	4.39	5.00	6.98	28.50	189.00
3	Construction	(0.66)	0.85	2.91	3.92	13.32	13.00	22.53	164.83	1434.00
4	Other Service		1.79	1.18	3.42	13.12	75.00	17.57	150.00	2179.00
5	Bulk/Fuel Feed		1.27	1.09	3.25	4.48	1.00	7.99	18.00	79.00
6	Trucking		0.95	2.09	4.11	6.28	3.00	12.65	105.83	605.00
7	Hotel/ Motel		1.30	1.91	1.68	5.03	43.00	6.60	25.50	94.00
8	Cafe/Rest'nt		0.80	1.64	3.16	7.53	37.50	13.40	85.67	1050.00
9	Welder/ Blacksmith			1.45	1.45	3.61	1.00	9.00	31.00	164.00
10	Insurance			1.32	2.24	3.95	4.00	6.65	40.50	599.00
11	Doctor			1.64	2.11	5.68	9.00	6.00	44.33	843.00
12	Bank			1.09	1.63	2.82	4.00	4.50	21.33	217.00
13	Beauty Salon			1.05	1.87	3.33	5.50	5.90	39.67	370.00

Vari-ables		8 Minor Service	7 Local Service	6 Large Local Service	5 Sub-District	4 District	3b (Banff)	3a Sub-Regional	2 Regional	1 Metro-politan
14	Hardware				1.53	1.64	3.00	1.82	5.67	23.00
15	Building Supplies			0.95	1.66	2.51	2.50	4.27	22.00	134.00
16	Farm Equipment				2.22	2.79		8.82	30.33	47.00
17	Electrician			0.73	1.16	2.61	5.00	4.90	26.67	234.00
18	Other Retail			0.66	0.95	2.59	5.00	4.80	74.00	326.00
19	Plumbing/ Heating			0.54	1.24	3.05	6.00	6.75	40.00	281.00
20	Auto Parts				0.94	3.25		5.90	43.17	174.50
21	Drug Store				1.03	1.95	3.00	3.70	14.83	132.00
22	Liquor Store				0.79	0.84		0.80	4.67	31.00
23	Meat/Frozen Food			0.65	(0.41)	1.13		1.50	8.50	50.00
24	Florist				0.68	1.00	2.00	2.60	10.67	113.00
25	Real Estate			0.95	1.03	3.89	6.00	7.05	41.83	389.00
26	Appliances				1.15	2.46	7.00	5.92	40.00	324.00
27	Accountant				0.71	2.61	3.00	4.10	30.00	454.00
28	Lawyer's Office				0.87	2.36	7.00	4.10	31.00	1059.00
29	Auto Sales				0.68	2.17	2.00	5.25	32.00	104.00
30	Crafts/Art/ Hobby				(0.63)	1.53	15.00	3.43	27.50	178.00
31	Department Store					1.08	1.00	1.45	8.33	25.00

		8	7	6	5	4	3b	3a	2	1
Vari-ables		Minor Service	Local Service	Large Local Service	Sub-District	District	(Banff)	Sub-Regional	Regional	Metro-politan
32	Veterinarian					1.47	1.00	2.50	8.00	95.00
33	Investment Co.			1.09		2.32	3.00	2.75	13.67	98.00
34	Dentist					1.68	5.00	3.10	29.33	380.00
35	Chiropractor					1.37	1.00	2.50	11.33	96.00
36	Credit Union					1.21	1.00	1.45	6.67	51.00
37	Bakery					1.13	2.00	1.40	7.67	68.00
38	Sand/Gravel					1.11		2.05	7.00	46.00
39	Womens Clothes					1.00	10.00	3.20	32.00	212.00
40	Catalogue Sales					(0.60)				
41	Management Consultant					(0.91)	1.00	1.45	11.67	211.00
42	Dry Cleaning/ Laundry					1.47	5.00	2.83	14.00	220.00
43	Excavating					2.06	1.50	6.30	33.50	257.00
44	Painter/ Decorator					2.03	3.00	2.40	34.67	237.00
45	Sports Goods					1.53	15.50	3.15	24.00	97.00
46	Cleaning Services					1.11		2.60	28.67	344.00
47	Gifts/ Novelty					1.26	23.00	1.48	18.00	159.00
48	General Clothing				0.69	1.05	4.00	2.08	18.33	47.00

Vari-ables		8 Minor Service	7 Local Service	6 Large Local Service	5 Sub-District	4 District	3b (Banff)	3a Sub-Regional	2 Regional	1 Metro-politan
49	Carpets/Floor Coverings					0.93	1.00	2.83	22.33	256.00
50	Travel Agent					1.21	4.00	1.85	11.33	193.00
51	Curtains/ Fabrics					0.87		2.13	23.17	137.00
52	Garden Centre					0.86		1.30	9.00	157.00
53	Barber					(0.64)		1.85	8.00	47.00
54	Furniture					0.75		2.23	20.33	97.00
55	Confec-tionary					0.64	6.00	1.55	11.17	55.00
56	Jewellery					0.63	10.00	1.80	18.67	146.00
57	Photographers & Supplies					0.97	4.00	2.05	20.00	243.00
58	Car Wash							1.56	9.67	46.00
59	Mens Clothes					0.68		1.90	14.67	89.00
60	Auctioneer							2.20	6.67	36.00
61	Supermarket					0.65	1.00	1.03	2.00	63.00
62	Funeral Home						2.00	1.00	3.00	22.00
63	Carpenter							1.45	19.67	53.00
64	Optometrist							2.00	11.33	121.00
65	Cinema						1.00	0.90	3.00	25.00

Variables		8 Minor Service	7 Local Service	6 Large Local Service	5 Sub-District	4 District	3b (Banff)	3a Sub-Regional	2 Regional	1 Metro-politan
66	Books/ Stationary							1.78	10.17	121.00
67	Luggage/ Leather						1.00	1.20	8.33	68.00
68	Car rental						7.00	1.35	11.67	83.00
69	Caterer						1.00	1.50	12.83	203.00
70	Bowling/ Billiards						1.00	1.10	10.33	33.00
71	Land Developer					(0.63)	1.00	0.80	5.67	116.00
72	Misc. Repairs							1.00	6.67	113.00
73	Shoes							1.25	13.00	144.00
74	Office Equipment						1.00	0.83	27.00	243.00
75	Music Store						1.00	1.10	15.67	70.00
76	Upholsterer						1.00	1.15	9.67	89.00
77	Mortgage						1.00		16.67	226.00
78	Architect								9.00	125.00
79	Motor Cycles						•	(1.10)	8.67	29.00
80	Health/Spec-ialty Food						1.00	(0.60)	7.33	70.00

		8	7	6	5	4	3b	3a	2	1
Vari-ables		Minor Service	Local Service	Large Local Service	Sub-District	District	(Banff)	Sub-Regional	Regional	Metro-politan
81	Second Hand Goods								8.33	43.00
82	Electrical Repairs							(0.68)	5.83	62.00
83	Mobile Home								4.00	7.00

Variables with values in brackets (o.63) have a frequency of occurance below 0.5 i.e. the commercial function is present in less than half the towns in the group. As such these functions are not considered representative of the group.

APPENDIX A(2) NUMBER OF ESTABLISHMENTS AT EACH GRADE OF PLACE: NORTHERN ALBERTA 1986

Mean Values (>0.6) of the Numbers of Commercial Variables in the Groups of Towns

		8	7	6	5	4	3	2	1
Variables		Minor Service	Local Service	Large Local Service	Sub-District	District	Sub-Regional	Regional	Metropolitan
1	Gas and Repairs	0.78	1.66	3.05	3.30	8.82	18.67	40.43	759.00
2	General Store	0.91	1.38	1.97	2.21	3.96	8.84	14.38	395.00
3	Construction		1.71	4.19	2.48	9.89	26.21	75.63	1030.00
4	Other Service	(0.67)	1.83	3.72	3.76	11.59	32.58	88.75	1845.00
5	Bulk Fuel/ Feed		1.01	0.83	2.07	4.02	6.26	5.55	71.00
6	Trucking		1.57	2.31	2.35	9.79	19.58	53.13	441.00
7	Hotel/ Motel		1.14	1.50	1.63	4.86	7.08	12.25	110.00
8	Restaurant		0.82	1.67	2.27	5.75	14.63	31.38	973.00
9	Welder/ Blacksmith			1.83	1.45	3.84	6.84	13.75	133.00
10	Insurance			0.75	1.39	2.93	8.18	18.00	442.00
11	Doctor			0.67	1.58	3.46	10.37	31.25	379.00
12	Bank			0.89	1.26	2.25	4.50	12.75	217.00
13	Beauty Salon			1.03	1.35	2.57	6.39	19.13	392.00

Vari-ables		8 Minor Service	7 Local Service	6 Large Local Service	5 Sub-District	4 District	3 Sub-Regional	2 Regional	1 Metro-politan
14	Hardware			0.86	1.11	2.06	3.03	6.80	22.00
15	Building Supplies			1.06	1.16	3.13	7.05	14.75	118.00
16	Farm Equipment			1.06	1.18	3.39	6.66	8.63	28.00
17	Electrician				0.76	1.43	3.74	4.75	235.00
18	Other Retail				0.87	1.70	5.92	22.50	259.00
19	Plumbing/ Heating			0.69	(0.68)	2.14	5.33	12.50	208.00
20	Auto Parts			0.61	1.10	2.88	6.44	14.63	165.00
21	Drug Store				0.90	1.70	3.47	7.50	186.00
22	Liquor Store				0.94	0.82	0.95	1.75	26.00
23	Meat/Frozen Food					(0.61)	1.55	3.38	56.00
24	Florist					1.13	2.63	5.50	108.00
25	Real Estate				0.82	2.50	7.16	20.00	315.00
26	Appliances					1.68	5.58	12.00	267.00
27	Accountant					2.21	7.13	19.75	506.00
28	Lawyer's Office				0.87	2.50	7.16	14.25	1154.00
29	Auto Sales				1.03	1.93	6.53	9.38	143.00
30	Crafts/Art/ Hobby					1.02	3.50	8.13	117.00
31	Department Store					1.43	3.05	3.25	52.00

		8	7	6	5	4	3	2	1
Vari-ables		Minor Service	Local Service	Large Local Service	Sub-District	District	Sub-Regional	Regional	Metro-politan
32	Veterinarian					0.79	2.47	3.00	56.00
33	Investment Co.				(0.68)	1.50	3.84	12.00	58.00
34	Dentist					1.50	5.21	12.75	432.00
35	Chiropractor						2.00	4.75	75.00
36	Credit Union					(0.61)	1.32	6.75	53.00
37	Bakery					0.68	1.16	3.50	78.00
38	Sand/Gravel					0.80	1.47	3.13	26.00
39	Womens Clothes					0.84	3.16	8.38	265.00
40	Catalogue Sales								
41	Management Consultant					(0.84)	2.16	11.25	172.00
42	Dry Cleaning/ Laundry					1.26	2.66	8.25	154.00
43	Excavating			0.94	(0.65)	1.55	4.47	15.75	113.00
44	Painter/ Decorator					0.93	3.21	16.00	181.00
45	Sports Goods					1.39	2.41	7.75	96.00
46	Cleaning Services					1.45	3.26	15.63	299.00
47	Gifts/ Novelty					0.71	1.63	6.25	165.00
48	General Clothing					0.99	2.64	8.93	47.00

		8	7	6	5	4	3	2	1
Vari-ables		Minor Service	Local Service	Large Local Service	Sub-District	District	Sub-Regional	Regional	Metro-politan
49	Carpets/Floor Coverings					0.79	1.89	4.50	81.00
50	Travel Agent					0.68	1.87	5.25	185.00
51	Curtains/ Fabrics						2.47	6.13	90.00
52	Garden Centre					0.75	2.42	5.63	186.00
53	Barber			0.61		(0.82)	1.82	6.75	44.00
54	Furniture					0.60	2.22	6.38	74.00
55	Confec-tionary					0.66	1.00	2.88	9.00
56	Jewellery						2.24	7.00	53.00
57	Photographers & Supplies					(0.71)	2.50	9.75	207.00
58	Car Wash						1.24	1.88	45.00
59	Mens Clothes					0.64	2.26	3.88	102.00
60	Auctioneer						1.58	1.25	21.00
61	Supermarket				0.60	1.31	1.85	4.30	59.00
62	Funeral Home						1.58	0.75	13.00
63	Carpenter					(0.68)	1.87	5.25	26.00
64	Optometrist						2.53	9.00	126.00
65	Cinema						0.95	2.00	43.00

		8	7	6	5	4	3	2	1
Vari-ables		Minor Service	Local Service	Large Local Service	Sub-District	District	Sub-Regional	Regional	Metro-politan
66	Books/ Stationary						1.92	5.75	120.00
67	Luggage/ Leather						(0.66)		48.00
68	Car rental					(0.96)	1.66	4.88	56.00
69	Caterer						(0.74)	4.00	130.00
70	Bowling/ Billiards					0.95	1.32	4.00	31.00
71	Land Developer					0.84	1.84	8.25	130.00
72	Misc. Repairs					0.82	1.97	4.62	133.00
73	Shoes						1.39	2.75	120.00
74	Office Equipment						1.61	8.00	204.00
75	Music Store						1.50	6.25	49.00
76	Upholsterer						0.68	1.75	54.00
77	Mortgage						1.00	3.75	159.00
78	Architect						(0.74)	4.75	132.00
79	Motor Cycles						(0.61)	2.38	28.00
80	Health/Spec-ialty Food						0.84	3.13	53.00

		J	I	H	F/G	E	C	B	A
Variables		Minor Service	Local Service	Large Local Service	Sub-Service	District	Sub-Regional	Regional	Metro-politan
81	Second Hand Goods							1.75	55.00
82	Electrical Repairs					1.41	2.03	12.00	51.00
83	Mobile Home						1.05	1.88	8.00

Variables with values in brackers (0.63) have a frequency of occurance below 0.5 i.e. the commercial functions is present in less than half the towns in the group.